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New taxa of *Hymenochaete* (*Agaricomycetes*, *Hymenochaetales*) with a note on *H. caucasica*

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Abstract — Five new species of *Hymenochaete*, *H. cystidiata*, *H. fuscotestacea*, *H. leppii*, *H. patellaris*, and *H. spinulosetosa*, and a new subspecies, *H. muroiana* subsp. *africana*, are described. *Hymenochaete caucasica* is redescribed and accepted as a distinct species and not a synonym of *H. minuscula.*

Key words — patelliform basidioma, spiny setae, *Hymenochaete pellicula*

Introduction

The author has studied the *Hymenochaetaceae* for over fifty-five years, beginning in 1957 with a paper on *Inonotus obliquus* (Parmasto 1957). In this paper five new species and one new subspecies of *Hymenochaete* are described. The taxa are from Australia, Brazil, Cameroon, Kenya, and Venezuela. In addition, *H. caucasica* from Georgia is redescribed.

Materials & methods

This study is based on herbarium specimens deposited in the herbaria BPI, CANB, E, K, O, S, and TAAM. Color notations are given using Munsell (1976, abbreviated M) and Kornerup & Wanscher (1967, abbreviated K & W). Spore size was measured, and *Q* (length/width quotient) values calculated as described in Parmasto (2006). Herbarium acronyms follow Thiers (2012).

Taxonomy

Hymenochaete cystidiata Parmasto, **sp. nov.**

MycoBank MB 564943

Basidiomata resupinata, ad 200 µm crassa. Tomentum et cortex desunt, stratum hypharum bene evolutum. Systema hypharum subdimiticum. Setae subulatae, acutae, sine

†Dr. Erast Parmasto, who had almost completed this paper at the time of his death, passed away on April 24, 2012. The paper presented here was prepared for publication by Karen K. Nakasone.

incrustatione, 60–100 × 7–10(–11) µm. Cystidia dispersa, cylindrica, tunicis incrassatis, 18–30 × 7–9 µm. Sporae subcylindricae, 4.8–5.8(–6.2) × (2.3–) 2.5–3.2 µm.

Type: Cameroon. S.–W. Province (Southwest Region): Korup Forest Reserve, Mundemba, on fallen branches, 8 Apr 1990, R. Watling 22123 (**Holotype,** E 60207; **isotype,** TAAM 202698).

Etymology: '*cystidiata*', with cystidia.

Basidiomata effuse, adnate but removable as pieces, soft coriaceous, 80–200 µm thick, up to 15 cm long. Hymenium smooth, azonate, not cracked, vinaceous buff (M: 7.5 YR 7/3; K & W: 5 C 3), without olive or lilac tint; margin 1–2 mm wide, indistinct or arachnoid, yellowish when young (M: 7.5 YR 8/10; K & W: 5 B 6).

Tomentum and cortex absent; hyphal layer composed of more or less loosely interwoven hyphae.

Hyphal system subdimitic; setal hyphae absent; generative hyphae 2–3 (–4) µm diam, with brownish, thickened walls, sparsely branched and with few septa, or partly thin-walled and hyaline. Hymenium with hyaline or yellowish conglomerates of crystalline or amorphous matter, 8–20 µm diam. Setae scattered or sometimes in groups, subulate to long-conical, with acute tip, straight, 60–100 × 7–10(–11) µm, usually enmeshed in hyphal sheath, without incrustation. Cystidia scattered, cylindrical, with rounded tips, 18–30 × 7–9 µm, with thickened walls (except in distal part), not encrusted; Hyphidia absent. Basidia clavate, 15–22 × 4.5–5.5 µm, with 4 thin sterigmata about 3 µm long. Basidiospores elongate ellipsoid, nearly subcylindric, with one side slightly concave, hyaline, thin-walled, 4.8–5.8(–6.2) × (2.3–)2.5–3.2 µm, average of 25 spores: 5.4 × 2.8 µm, $Q = 1.95$.

Remarks—Cystidia in species of *Hymenochaete* are atypical in that they appear to be differentiated hyphal ends that are often encrusted hyphidia, basidioles, or thin-walled setae with a rounded tip. In *H. cystidiata* the cystidia seem to be analogous with basidioles and are not true cystidia as found in corticioid *Polyporales*.

Hymenochaete fuscotestacea Parmasto, **sp. nov.**

MycoBank MB 564949

A H. cinnamomea *hyphis crassitunicatis granulosis moniliformibus, hyphidiis spinosis, et basidiosporis late ellipsoideis 4.8–5.4(–5.6) × (3.2–)3.3–3.9(–4) µm differt.*

Type: Venezuela, Aragua Province, Parc National Henri Pittier, Rancho Grande, on angiospermous wood on the ground, 29 Aug 1999, K.-H. Larsson 11024 (**Holotype**, O; **isotype**, GB).

Etymology. '*fusco-*', dark; '*testaceus*' brick-red.

Basidiomata effuse, adnate but removable as pieces, soft coriaceous, 400–800 µm thick, rounded. Hymenium smooth, azonate, not cracked, dark Brick to

Umber (M: 2.5–5 YR 4/4; K & W: 7 E–F 8), without olive or lilac tint; margin indistinct or arachnoid, concolorous with the hymenium.

Tomentum and cortex absent; hyphal layer composed of loosely interwoven hyphae.

Hyphal system monomitic; setal hyphae absent; generative hyphae with thickened or thick walls, branched at right angles, with numerous septa, brown, 3.5–4.5(–5) µm diam, partly with monilioid wall thickenings (similar to those in *H. semistupposa* Petch and *H. yasudae* Imazeki). Setae numerous, subulate, with acute tip, straight, (50–)55–80 × 6–8 µm, some enmeshed in hyphal sheaths, without incrustation. Hyphidia numerous, cylindrical, up to 6 µm diam, with numerous septa, yellowish, with thickened walls covered with granules, then with densely arranged, small, upward pointed thorns. Basidia clavate, 12–18 × 5–6 µm, sterigmata 4, thin, about 3 µm long. Basidiospores broadly ellipsoid, 4.8–5.4(–5.6) × (3.2–)3.3–3.9(–4) µm (average size: 5.1 × 3.6 µm; $Q = 1.4$).

Remarks—The loosely interwoven septate, branched hyphae of the context and size and form of setae in *H. fuscotestacea* are similar to *H. cinnamomea* (Pers.) Bres. However, *H. cinnamomea* lacks monilioid hyphae and has smaller, cylindrical to ellipsoid spores, average size 5.0–6.7 × 2.1–2.8 µm; $Q = 2.0–2.8$. The unusual, thorny, claw-like outgrowths of the hyphidial walls are similar to that found in *H. mollis* Bres. In a less pronounced form, these outgrowths also occur in some specimens of *H. cinnamomea.*

According to a cladistic analysis of molecular data, *H. fuscotestacea* (as *Hymenochaete* sp.) clustered with *H. rubiginosa* (Dicks.) Lév. and *H. cinnamomea* (Larsson et al. 2004).

Hymenochaete leppii Parmasto, **sp. nov.**

MycoBank MB 564944

Basidiomata patelliformia, ad 1(–3) mm crassa, molle. Systema hypharum monomiticum, hyphae dichotomae vel ad angularum 90° patentes. Dendrohyphidiae abundae. Sporae naviculare (5.0–)5.2–6.2(–6.5) × (2.2–)2.4–2.8(–3.0) µm.

Type: Australia, Tasmania, Mt. Field National Park, Lyrebird Nature Trail, mixed rainforest, 7 Apr 2000, H. Lepp 2717 (**Holotype**, CANB 627018; **isotype**, TAAM 091457).

Etymology: (Heino) '*Lepp*', Australian collector of fungi and lichens.

Basidiomata patelliform, effuse with slightly raised or narrowly reflexed margins, soft, cottony, fragile, up to 5 cm in diam, then confluent, (200–) 500–1000(–3000) µm thick. Abhymenial surface uneven, minutely tomentose, dark Sienna or cognac brown (M: 7.5 YR 4/8 or 5/10; K & W: 6 D–E 7). Hymenium uneven, sometimes slightly concentrically sulcate, grayish light Umber (M: 7.5 YR 5/4–6 to 4/4; K & W: 6 E 3–4 or 6 D–E 5), in old specimens brown (M: 7.5 YR 5/8–10 to 5 YR 4/8); margin abrupt, light Fulvous (M: 7.5 YR 7/10; K & W: 5 C–D 7), then Fulvous (M: 7.5 YR 5/10). Context densely soft, cottony.

Abhymenial surface densely covered with short, thin dendrohyphidia-like brownish hyphae.

Tomentum and cortex absent; hyphal layer composed of rather densely interwoven, but distinct, not agglutinated hyphae.

Hyphal system monomitic; setal hyphae absent; generative hyphae (2–)3–4(–5) in diam, with slightly thickened walls, brownish, moderately branched, mainly at right-angles or dichotomously, with numerous septa. Setae numerous, 80–130(–150) × (5–)7–12 μm, emerging up to 100 μm or more above the hymenial level, subulate, with acute tip, straight, without incrustation. dendrohyphidia numerous in hymenium, distinct, simple or usually forked or 2–3 times branched, with thin branches, up to 5–6 μm diam in base, brownish, similar to context hyphae. Basidia clavate, with 4 thin sterigmata. Basidiospores navicular, in holotype (5.0–)5.2–6.2(–6.5) × (2.2–)2.4–2.8(–3.0) μm (average 5.7 × 2.6 μm; *Q* = 2.2).

Additional specimens examined — **Australia**, **New South Wales**: Parkers Gap, Tallaganda State Forest, 7 km SE of Captains Flat, wet *Eucalyptus* forest, on side of a fallen rotten trunk, 5 Aug 1992, H. Lepp 870 (CANB 569442; TAAM 091443); Red Rock, 30 km NNE of Coffs Harbour, mixed subtropical vegetation with *Eucalyptus* and *Casuarina* dominant, underside of long-dead wood on the ground, 19 Apr 1998, H. Lepp 1937 (CANB 569454; TAAM 091440).

Remarks—Only two other *Hymenochaete* species have patelliform basidiomata, i.e., plate-like with defined free margins — *H. patellaris* and *H. patelliformis* G. Cunn. Both lack dendrohyphidia and have somewhat smaller spores. Hyphae of *H. leppii* resemble dichohyphae of *Dichochaete* spp. (see Parmasto 2001: 56–57).

Hymenochaete muroiana subsp. ***africana*** Parmasto, **subsp. nov.**

MycoBank MB 564945

A Hymenochaete muroiana *subsp.* muroiana *setis (30–)35–60(–80)* μ*m longis basim ad normam non bifurcatis, basidiomatis 50–80* μ*m crassis differt.*

Type: Kenya. Eastern Province, Aberdare Mts., Kimakia Forest Sta. (0°45′S, 36°50′E), alt. c. 2200–2400 m, 16–18 Jan 1973, L. Ryvarden 8900 (**Holotype**, O; **isotype**, TAAM 132384).

Etymology: '*africanus*', growing in Africa.

Basidiomata effuse, closely adnate, hard when dry, as rounded patches 5–15 mm diam, then confluent, up to 50 mm long, thin, 50–80 μm thick; hymenium smooth, azonate, irregularly cracked when old, Umber or tobacco brown (M: 5 YR 5–4/4; K & W: 7 E 6-7), without olive or lilac tint; margin distinctly delimited, concolorous with hymenium.

Tomentum, cortex, and hyphal layer absent or hyphal layer indistinct from thin, dark brown setal layer, 10–25 μm thick; dark line above the hymenium absent; no crystals in context or in hymenium.

Hyphal system monomitic; hyphae of context densely agglutinated, with thickened walls, 2–3 µm in diam. Setae numerous, (30–)35–60(–80) × 6–8(–9) µm, projecting 20–50 µm above the hymenium, subulate, some with L-shaped base, thick-walled, with acute tip, sometimes upper part slightly curved, usually with a thin hyphal sheath. Cystidia absent. Hyphidia absent. Basidioles few. Basidia subcylindrical or subutriform, 15–20 × 4–5 µm; sterigmata 4, thin, 3–4 µm long. Basidiospores broadly ellipsoid, (4.3–)4.5–5.5(–5.6) × (2.8–)3–3.5 (–3.7) µm (average of 25 spores: 5.1 × 3.2 µm, $Q = 1.6$).

On a dead bamboo; causes a white fibrous rot.

Remarks—Subspecies *africana* is morphologically similar to subsp. *muroiana*, which differs in shorter setae, 18–40(–50) × 5–8 µm, with bifurcate base and thinner basidiomata, 15–40 µm thick. In addition, subsp. *muroiana* is widely distributed in eastern Asia, Indochina, and Hawaii (Parmasto 2005a,b).

Hymenochaete patellaris Parmasto, **sp. nov.**

MycoBank MB 564946

A Hymenochaete patelliformis *hyphis sceletoidibus in strato hypharum, setis obtusis apicibus, basidiosporis grandibus, 4.5–5.5(–6) × 2.5–3.2 µm differt.*

Type: Brazil. Rio Grande do Sul, Serra Azul, 1925, J. Rick (**Holotype**, BPI 277472).

Etymology: '*patellaris*', like a shallow dish.

Basidiomata seemingly effuse, but really patelliform, soft coriaceous, up to 3 cm diam, then confluent, 50–80 µm thick; abhymenial surface uneven, dark Fulvous (M: 7.5 YR 5/7; K & W: 6 D 6–7), near margin slightly lighter; hymenium uneven, with a few cracks, sometimes concentrically sulcate, slightly lighter colored than abhymenium; margin abrupt.

Tomentum, cortex and hyphal layer present; dark line present above the hymenium; no conglomerates of crystals in context or hymenium.

Hyphal system (sub)dimitic; skeletal hyphae of the hyphal layer more or less parallel, loosely intertwined, with thickened or thick walls, brown, 2–3 µm in diam; generative hyphae thin-walled, yellowish. Setae numerous, subfusoid, thick-walled, with blunt tip, 22–35(–40) × 4.5–6.5(–7) µm, projecting up to 20 µm above the hymenium, covered with a hyphal sheath. Cystidia absent. Hyphidia absent. Basidioles few. Basidia subcylindrical or subutriform, sterigmata 4, thin, 3–4 µm long. Basidiospores broadly ellipsoid or subcylindric, 4.5–5.5(–6) × 2.5–3.2 µm (average of 30 spores: 5.1 × 2.8 µm, $Q = 1.8$).

Remarks—*Hymenochaete patellaris* is possibly closely related to *H. patelliformis* from New Zealand, which differs in setae with acute tip, 25–50 × 5–6(–7) µm, smaller ellipsoid spores (2.5–)3–4 × 1.5–1.8 µm, and absence of skeletal hyphae

in the hyphal layer. Skeletoid hyphae are present in the hyphal layer of *H. cacao* (Berk.) Berk. However, *H. cacao* has pileate, dimidiate to flabelliform basidiomata, densely compacted hyphae, unsheathed and acute tipped setae, and smaller basidiospores (2.8–)3.5–4 × (1.8–)2–3 µm.

Hymenochaete spinulosetosa Parmasto, **sp. nov.**

MycoBank MB 564947

A speciebus Hymenochaetes *setis spinosis basidiomatibus 700–1000 µm crassis, setis longis (45–)50–75(–90) × 5–7.5(–9) µm, basidiosporis grandibus 5–6.2(–6.5) × (3–)3.2–3.7 µm differt.*

Type: Venezuela. Prov. Merida, Monte Zerpa by Merida, alt. 2000 m, on dead hardwood, 29 Jan 2001, L. Ryvarden 43707 (**Holotype**, O; **isotype,** TAAM 202926).

Etymology. '*spinula*', spike, thorn; '*seta*', seta

Basidiomata effuse, closely adnate, hard woody when dry, as rounded patches 1–2 cm long, then confluent, thick (up to 700–1000 µm); hymenium smooth, azonate, irregularly deeply cracked when old, brown (M: 5 YR 4/2–3; K & W: 6 E 4–5), without olive or lilac but sometimes with grayish tint; margin distinctly delimited, concolorous with hymenium.

Tomentum, cortex and hyphal layer absent; dark brown setal layer thickening, but distinct dark line absent; crystals absent in context and hymenium.

Hyphal system monomitic; hyphae of the setal layer densely agglutinated, with thickened walls, brown, 2–4(–5) µm diam. Setae numerous, subulate, thick-walled, with acute tips, (45–)50–75(–90) × 5–7.5(–9) µm, projecting 20–45 µm above the hymenium, thorny, usually with 3–5(–8) small spikes, 1.5–3(–4) µm long or subspherical protuberances 1.2–1.8 µm diam, some with a thin hyphal sheath. Cystidia absent. Hyphidia numerous, with thin yellowish walls, 1.5–3 µm diam. Basidia subcylindrical to subutriform, 12–20 × 4–5.5 µm; sterigmata 4, thin, 3.5–4 µm long. Basidiospores broadly ellipsoid, with one side flattened, 5–6.2(–6.5) × (3–)3.2–3.7 µm.

Remarks—There are six species of *Hymenochaete* with thorny setae composed of few to 8–10 spiny to subspherical protuberances. They differ from *H. spinulosetosa* in having non-thickening basidiomata, 50–150 µm thick, shorter setae, 40–60(–70) µm long, and shorter spores, 3–4.5 µm long, except in *H. pellicula* Berk. & Broome the spores are up to 5 µm long. Two species, *H. separabilis* J.C. Léger and *H. tomentelloidea* Gilb. & Hemmes, have a well-developed hyphal layer. *Hymenochaete spinulosetosa* is the only species of this group found in America.

Hymenochaete spinulosetosa may be related to *H. pellicula* which was found only once in Sri Lanka and described by Petch (1925: 278) and Léger (1998: 214). The holotype was examined (K, Ceylon no. 990); it has a thin basidiomata up to 50 µm thick, short setae 45–65 × 5–7 µm, and small basidiospores 4.5–5.5 ×

2.5–3.5 µm. *Hymenochaete pellicula* was reported from Philippines by Bresadola & Sydow (1914: 351) and Bresadola (1915: 302), but the specimens cited in these papers obtained from BPI, K, and S were identified as *H. muroiana* or *H. murina* Bres.

Hymenochaete caucasica Parmasto, Mikol. Fitopatol. 20 (5): 374. 1986.

Basidiomata annual (?), effuse, adnate, suberose, 0.5–2 cm in diam, then confluent and up to 10 cm long, thin, 40–120 µm thick; hymenium smooth, pale to dark ochraceous (M: 7.5 YR 6.5/6 to 7.5/5; K & W 5 B–C 4 to 5 C 4–5); margin thin, farinose, concolorous with the hymenium.

Tomentum, cortex and setal layer absent; hyphal layer composed of densely interwoven hyphae.

Hyphal system monomitic; setal hyphae absent. Generative hyphae with thin or thickened walls, branched, septate, brown, 2.2–3.5 µm diam. Setae narrowly conical, with acute tip, 28–45(–53) × 4.5–7.5(–9) µm, projecting up to 25 µm above the hymenium. Hyphidia few, cylindrical, hyaline or yellowish, thin-walled, 2–3.5 µm diam. Basidia slightly utriform, 10–16 × 3.7–5 µm, sterigmata 4, thin. Basidiospores short-cylindrical, slightly curved, 4.5–5.6 (–6.0) × 2–2.5 µm (average size 4.9 × 2.2, Q = 2.2).

Specimens examined: **GEORGIA**. **Tshakva Distr.**, Thigeri, on fallen twigs of *Buxus colchica* Pojark., 28 Sep 1963, E. Parmasto (Holotype, TAAM 016997); Hulo Distr., Bakho, alt. 1700 m, on a fallen trunk of *Abies nordmanniana* (Steven) Spach, 3 Oct 1963, E. Parmasto (TAAM 016035).

Remarks—Léger (1998: 86, 191) synonymized *H. caucasica* with *H. minuscula* G. Cunn. Originally described from New Zealand (Cunningham 1957), *H. minuscula* has been reported from Réunion (Western Indian Ocean, det. Léger), Argentina (Job 1990), Brazil, Colombia, Jamaica and Venezuela (Escobar 1978). I have studied the isotype of this species (BPI 278247; Léger studied the holotype, PDD 11242). *Hymenochaete minuscula* differs from *H. caucasica* by a darker hymenium (M: 7.5 YR 5/7), larger setae, sometimes slightly sinuose, with a slightly curved tip, (45–)50–65(–70) × (6–)7–9(–10) µm, and larger basidia about 20 × 5–6 µm. The basidiospores of *H. minuscula* described by Léger are 4–5 × 1.8–2.2 µm, smaller than in *H. caucasica*. In the isotype studied, basidiospores were few and decayed. The distributions of *H. caucasica* and *H. minuscula* are quite different. Because of these differences, I prefer to recognize the species as separate taxa.

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